Amendments to the Claims

Claims 1-35, 54-55 and 58-61 are currently pending in this application. Claims 36-53, 56-57 and 62-74 were withdrawn by applicant's election of Group I. That affirmation was provided in the Amendment filed by applicant January 13, 2003, in which Claim 54 was re-presented in independent format and Claim 55 was amended to depend from Claim 54.

Please now amend Claim 58 as follows:

1. (Original) A process for reducing the energy consumed by a display having a plurality of liquid crystal elements, the light passed by each liquid crystal element being regulated by a capacitive element associated with the liquid crystal element, each capacitive element having the ability to be selectively charged by the delivery of current through a line associated with the capacitive element, the line also driving one or more other capacitances in the display other than the capacitive elements, the process comprising:

a) charging a first one of the capacitive elements and at least a portion of the other capacitances by delivering a current through the line associated with the first one of the capacitive elements; and

b) recovering energy from the portion of the other capacitances without at the same time recovering energy stored in the first one of the capacitive elements.

2. (Original) The process of claim 1 wherein the process is repeated for each of the capacitive elements other than the first one of the capacitive elements and wherein energy is not recovered from any of the capacitive elements during the time that energy is recovered from the other capacitances.

3. (Original) The process of claim 1 wherein each capacitive element is connected to the line associated with the capacitive element through an electronic switch.

4. (Original) The process of claim 1 wherein adiabatic charging is used to charge the capacitive element.

5. (Original) The process of claim 4 wherein the adiabatic charging utilizes a ramp signal.

6. (Original) The process of claim 4 wherein the adiabatic charging utilizes a staircase signal.

7. (Original) The process of claim 4 wherein the adiabatic charging utilizes a half-wave sine pulse.

8. (Original) The process of claim 1 wherein adiabatic discharging is used to recover energy from the other capacitances.

9. (Original) The process of claim 8 wherein the adiabatic discharging utilizes a ramp signal.

10. (Original) The process of claim 8 wherein the adiabatic discharging utilizes a staircase signal.

11. (Original) The process of claim 8 wherein the adiabatic discharging utilizes a halfwave sine pulse.

12. (Original) The process of claim 1 wherein the display is a liquid crystal display, an electroluminescence display or a field-emission display.

13. (Original) A process for reducing the energy consumed by a display having a plurality of liquid crystal elements arranged in a plurality of rows and columns, the light passed by each liquid crystal element being regulated by a capacitive element associated with the liquid crystal element, each capacitive element having the ability to be selectively charged by the delivery of current through a line associated with the capacitive element, the line also driving one or more other capacitances in the display other than the capacitive elements, the process comprising:

a) charging a first one of the capacitive elements and at least one portion of the other capacitances by delivering a current through the line associated with the first one of the capacitive elements; and

b) recovering energy from the portion of the other capacitances without at the same time recovering energy stored in the first one of the capacitive elements or from the capacitive elements that are associated with the liquid crystal elements that are in the same row as the liquid crystal element that is associated with the first one of the capacitive elements.

14. (Original) The process of claim 13 wherein the process is repeated for each of the capacitive elements other than the first one of the capacitive elements and wherein energy is not recovered from any of the capacitive elements during the time that energy is recovered from the other capacitances.

15. (Original) The process of claim 13 wherein each capacitive element is connected to the line associated with the capacitive element through an electronic switch.

16. (Original) The process of claim 13 wherein adiabatic charging is used to charge the capacitive element.

17. (Original) The process of claim 16 wherein the adiabatic charging utilizes a ramp signal.

18. (Original) The process of claim 16 wherein the adiabatic charging utilizes a staircase signal.

19. (Original) The process of claim 16 wherein the adiabatic charging utilizes a halfwave sine pulse.

20. (Original) The process of claim 13 wherein adiabatic discharging is used to recover energy from the other capacitances.

21. (Original) The process of claim 20 wherein the adiabatic discharging utilizes a ramp signal.

22. (Original) The process of claim 20 wherein the adiabatic discharging utilizes a staircase signal.

23. (Original) The process of claim 20 wherein the adiabatic discharging utilizes a half-wave sine pulse.

24. (Original) The process of claim 13 wherein the display is a liquid crystal display, an electroluminescence display or a field-emission display.

25. (Original) A circuit for reducing the energy consumed by a display having a plurality of liquid crystal elements, the light passed by each liquid crystal element being regulated by a capacitive element associated with the liquid crystal element, each capacitive element having the ability to be selectively charged by the delivery of current through a line associated with the capacitive element, the line also driving one or more other capacitances in the display other than the capacitive elements, the circuit comprising:

a) a voltage connection system connected to the line for controllably causing the line to connect to a voltage source;

b) a recovery connection system connected to the line for controllably causing the line to connect to a reservoir; and

c) a control system for causing the voltage connection system to connect the line to the voltage source during a first time period and for causing the recovery connection system to connect the line to the reservoir during a second time period, the voltages on the capacitive elements associated with the line not being materially changed during the second time period.

26. (Original) The circuit of claim 25 wherein:

a) the source and reservoir constitute a supply that generates a signal that facilitates adiabatic charging and discharging;

b) said voltage connection system includes a first electrical switch ing system connected between the supply and the line;

c) said recovery connection system includes a second electrical switching system connected between the supply and the line; and

d) said control system controls said first and second electrical switching systems.

27. (Original) The circuit of claim 26 wherein the signal includes a ramp signal.

28. (Original) The circuit of claim 26 wherein the signal includes a staircase signal.

29. (Original) The circuit of claim 26 wherein the signal includes a half-wave sine pulse.

30. (Original) The circuit of claim 26 wherein said first electrical switching system includes a transmission gate connected in series with a MOSFET.

31. (Original) The circuit of claim 26 wherein said second electrical switching system includes a MOSFET.

32. (Original) The circuit of claim 26 wherein said second time period begins a predetermined amount of time after said first time period.

33. (Original) The circuit of claim 26 wherein said second time period begins when the voltage of the signal is approximately equal to the voltage of the line.

34. (Original) The circuit of claim 33 further including a comparator circuit connected to the supply and to the line for determining when the voltage of the supply is substantially equal to the voltage of the line.

35. (Original) The circuit of claim 25 wherein the display is a liquid crystal display, an electroluminescence display or a field-emission display.

36. (Withdrawn)

37. (Withdrawn)

38. (Withdrawn)

39. (Withdrawn)

40. (Withdrawn)

41. (Withdrawn)

42. (Withdrawn)

43. (Withdrawn)

44. (Withdrawn)

45. (Withdrawn)

46. (Withdrawn)

47. (Withdrawn)

48. (Withdrawn)

49. (Withdrawn)

50. (Withdrawn)

51. (Withdrawn)

52. (Withdrawn)

53. (Withdrawn)

54. (Previously re-presented) A method for driving one of a plurality of pixels of a display and one or more other capacitances that are associated with a line other than the pixels of a display comprising:

a) electrically connecting each of the plurality of pixels of a display to the line;

b) storing charge in the one of the plurality of pixels of a display through the line while each of the other of the plurality of pixels of a display is electrically connected to the line; and

c) recovering energy stored in the other capacitances while maintaining the charge stored in the one of the plurality of pixels of a display.

55. (Previously amended) A method for driving one of a plurality of pixels of a display as claimed in Claim 54, wherein the display is one of a liquid crystal display, an electroluminescence display and a field-emission display.

56. (Withdrawn)

57. (Withdrawn)

58. (Currently Amended) A process for reducing the energy consumed by a display having a plurality of liquid crystal elements arranged in a matrix of rows and columns, the light passed by each liquid crystal element being regulated by a capacitive

element associated with the liquid crystal element, each capacitive element having the ability to be selectively charged by the delivery of current through a line associated with the capacitive element, the line also driving one or more other capacitances in the display other than the capacitive elements, each of the plurality of liquid crystal elements being driven to the approximate voltage of a serial video signal, the process comprising:

a) storing the voltage of the video signal for each capacitive element in a storage device;

b) applying the stored voltage for each capacitive element to each capacitive element through a first voltage regulator; and

c) recovering energy from the other capacitances ~~using a second voltage regulator~~.

59. (Original) The process of Claim 58 wherein adiabatic charging is used in applying the stored voltage.

60. (Original) The process of Claim 58 wherein adiabatic discharging is used in recovering the energy.

61. (Original) The process of Claim 58 wherein the first and second voltage regulators constitute the same device.

62. (Withdrawn)

63. (Withdrawn)

64. (Withdrawn)

65. (Withdrawn)

66. (Withdrawn)

67. (Withdrawn)

68. (Withdrawn)

69. (Withdrawn)

70. (Withdrawn)

71. (Withdrawn)

72. (Withdrawn)

73. (Withdrawn)

74. (Withdrawn)